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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/896,783	06/29/2001	Clyde George Bethea	25-66-105-20-29-1-3-35-14	8896

7590 03/26/2004

Lucent Technologies Inc.
Docket Administrator (Room 3J-219)
101 Crawfords Corner Road
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EXAMINER	
NGO, HUNG NHAT	
ART UNIT	**PAPER NUMBER**
2633	7

DATE MAILED: 03/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/896,783	C. G. BETHEA ET AL	
	Examiner	Art Unit	
	Hung N Ngo	2633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-22 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-22 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 9/4/02 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 2, 4-7, 8-14 and 17-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abrahamson (US005617235A) in view of Puzey (US 20030206691A1).

Regarding claim 1, Abrahamson discloses a process for optically transmitting data to a remote receiver (6), comprising: receiving a stream of input data signals (Fig. 2); modulating a IR laser (5) by direct modulation (Fig. 1) with a waveform whose sequential values are responsive to the data signals of the stream (lines 5-15 of column 5), the direct modulation including pumping the IR laser to produce high and low optical power levels in response to different ones of the values (column 5); and transmitting output light from the modulated IR laser to the remote receiver (6) via a free space communications channel. Abrahamson does not discloses IR laser is a mid IR laser, however, it is well known in the art to use mid IR laser for generating optical communication signal being transmitted in free space (see Abstract of Puzey);

therefore, it would have been obvious to use mid IR laser for generating optical communication signal being transmitted in free space. The wavelength ranges recited in claims 8, 9, 17 and 18 are mid IR wavelengths; therefore, the limitations in claims 8, 9, 17 and 18 are included in the above rejection.

Regarding claim 2, Abrahamson discloses the remote receiver (6) is configured to identify received light associated with the high optical power level and the low optical power as "signal-on" and "signal-off" states of the IR laser, respectively (see signal 12 in Fig. 2).

Regarding claim 4, Abrahamson discloses the modulating by direct modulation pumps the mid-IR laser to be in a lasing state during first intervals in response to input data signals having first signal values and to be in a non-lasing state during second intervals in response to input data signals having second signal values (lines 10-15 of column 5).

Regarding claim 5, Abrahamson discloses the first intervals are shorter than the second intervals (Fig. 2).

Regarding claim 6, Abrahamson discloses the first and second signal values are first and second digital values, respectively (see Fig. 2).

Regarding claim 7, Abrahamson does not discloses "the modulating produces light of a wavelength between about 3.5 microns and about 24 microns"; however, wavelength between about 3.5 microns and about 24 microns is the wavelength range of mid ir laser; therefore, the limitations of claim 7 are included in the above rejection.

Regarding claim 10, Abrahamson does not discloses "the modulating produces

light in a spectral window in which atmospheric attenuation is lower than at adjacent wavelength ranges". However, it is well known in the art choice a spectral window in which atmospheric attenuation is lower than at adjacent wavelength ranges so that the signal can be transmitted to a far destination and the optical power is maintained at desired value.

Regarding claims 11 and 12, Abrahason does not discloses "the transmitting sends sequential modulated optical values at a rate that is at least as high as 1 or 2 giga-Hertz". However, it is well known in the art to transmit optical signal at a rat least as high as 1 or 2 giga-Hertz to meet the demand of modern optical communication system; therefore, it would have been obvious to one skill in the art provide optical source in Abrahamson apparatus that transmit IR laser signal at a rate least as high as 1 or 2 giga-Hertz to meet the demand of modern optical communication system.

Regarding to claim 13, Abrahamson discloses a process for optically transmitting data to a remote receiver (6), comprising: receiving a stream of input data signals (Fig. 2); modulating a IR laser (5) by direct modulation (Fig. 1) with a waveform whose sequential values are responsive to the data signals of the stream (lines 5-15 of column 5), the direct modulation including pumping the IR laser to produce high and low optical power levels in response to different ones of the values (column 5); and transmitting output light from the modulated IR laser to the remote receiver (6) via a free space communications channel. Abrahamson does not discloses IR laser is a mid IR laser, however, it is well known in the art to use mid IR laser for generating optical communication signal being transmitted in free space (see Abstract of Puzey);

therefore, it would have been obvious to use mid IR laser for generating optical communication signal being transmitted in free space.

Regarding claim 14, Abrahamson discloses "the modulator is configured to cause the mid-IR laser to lase in the portions of the intervals and to not lase in the remainders of the intervals" (lines 5-15 of column 5).

Regarding claim 19, Abrahamson does not discloses "the modulating produces light in a spectral window in which atmospheric attenuation is lower than at adjacent wavelength ranges". However, it is well known in the art choice a spectral window in which atmospheric attenuation is lower than at adjacent wavelength ranges so that the signal can be transmitted to a far destination and the optical power is maintained at desired value.

Regarding claim 20, Abrahamson does not discloses "collimating optics positioned to collimate output light from the mid-IR laser into a beam with a diameter of at least 1 millimeter"; However, it is well known in the art to provide collimating optics positioned to collimate output light from the mid-IR laser into a beam with a diameter of at least 1 millimeter to expend IR laser beam to about 1 millimeter to make coupling of laser beam to another optical element more easily and therefore increase optical coupling efficiency.

Regarding claim 21, Abrahamson does not discloses "the modulator applies an optical pumping light to the gain media to modulate pumping of the gain media" however, Using light source as pumping means for laser is very common since it is easily to design and pump energy can be utilized with high efficiency ; therefore, it

would have been obvious to one skill in the art to use light source as pumping means for laser to simplify to design of laser apparatus of Abrahamson and in crease the efficiency of pump energy.

Claims 3 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abrahamson (US005617235A) in view of Nicia (4,744,087). Regarding claims 3 and 22, Abrahamson does not discloses "the modulating a mid-IR laser by direct modulation includes pumping a gain region of the laser with a modulation current whose successive values are responsive to the data signals of the stream". However, it is well known in the art to use electrical current as pumping means for laser to generate desired optical power output for the laser (see claim 1 of Nicia). Therefore, it would have been obvious to one skill in the art to use electrical current as pumping means for laser of Abrahamson to generate desired optical power output for the laser.

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Abrahamson (US005617235A) in view of McLellan US (4412333 A). Regarding claim 15, Abrahamson does not discloses "the modulator applies a voltage across the gain media to modulate pumping of the media". However, it is well known in the art to use voltage source as pumping means for laser to generate desired optical power output for the laser at the same time eliminating the need for a costly and less reliable pulsed discharge system for its excitation. (see lines 5-15 of of column 1 of McLellan) . Therefore, it would have been obvious to one skill in the art to use voltage source as pumping means for laser of Abrahamson to generate desired optical power output for the laser.

Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Abrahamson (US005617235A) in view Puzey (US006351482B1). Regarding claim 16, Abrahamson does not discloses "the mid-IR laser is a quantum cascade laser". However, It is well known in the art to use quantum cascade laser to generate mid IR laser since quantum cascade laser producing high quality mid IR laser (see lines 15-40 of column 7 of Puzey). Therefore, it would have been obvious one skill in the art to use quantum cascade laser to generate mid IR laser in Abrahamson to producing high quality mid IR laser.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hung N Ngo whose telephone number is (703) 308-0297. The examiner can normally be reached on M-F (8:30-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on 703-305-4729. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Hung N Ngo
Primary Examiner
Art Unit 2633

hn